prize of 2500 francs and one mention of 1500 francs), for the discovery of a means of rendering some mechanical art less unhealthy; Jecker prize (10,000 francs), for the author of the work most useful to organic chemistry; Cahours prize (3000 francs), for the encouragement of young men already known to have done good work, more particularly by researches in chemistry; Houzeau prize (700 francs), for a young chemist of merit.

Mineralogy and Geology.—Delesse prize (1400 francs), for work in geology, or, alternatively, in mineralogy. It may be divided. Joseph Labbé prize (1000 francs), for geological work or researches with reference to the mineral wealth of France, its colonies or protectorates, or, in default, to recompense the author of any work made in the general interest.

Botany.—Desmazières prize (1600 francs), for the best work on cryptogams published during the preceding year; Montagne prize (1500 francs), to the author or authors of important discoveries or works on the cellular plants; Jean Thore prize (200 francs), for the best memoir on the fluviatile or marine algæ of Europe, or on mosses, lichens, or European fungi; de la Fons Mélicocq prize (900 francs), for the best work on the botany of the North of France; de Coincy prize (900 francs), for a work on phanerogams; Jean de Rufz de Lavison prize (500 francs), for work in plant physiology.

Anatomy and Zoology.—Cuvier prize (1500 francs), for work in anatomy and zoology; Savigny foundation (1500 francs), for the assistance of young travelling zoologists, not receiving a Government grant, who specially occupy themselves with the invertebrates of Egypt and Syria.

Medicine and Surgery.—Montyon prize (three prizes of 2500 francs, three honourable mentions of 1500 francs, citations), for discoveries or improvements during the year in medicine or surgery; Barbier prize (2000 francs), for a discovery valuable in surgery, medicine, pharmacy, or in botany having a relation to the art of healing; Bréant prize (100,000 francs), the capital sum is offered to anyone discovering a specific cure for Asiatic cholera or for the discovery of the causes of this terrible scourge; Godard prize (1000 francs), for the best memoir on the anatomy, physiology, and pathology of the urino-genitary organs; Chaussier prize (10,000 francs), for the best book or memoir showing an advance in legal or practical medicine; Mège prize (10,000 francs), to the author who continues or completes the essay of Dr. Mège on the causes which have retarded or favoured the progress of medicine from antiquity to the present day; Bellion prize (1400 francs), for works or discoveries especially profitable to the health of man or the amelioration of the human species; Baron Larrey prize (750 francs), to a doctor or surgeon belonging to the Army or Navy for the best work presented to the Academy in the course of the year dealing with military hygiene, surgery, or medicine; Argut prize (1200 francs), for a discovery allowing the cure, by medicine, of a disease up to the present only capable of being dealt with surgically.

Physiology.—Montyon prize (750 francs), for the most useful work in experimental physiology; Lallemand prize (1800 francs), for work relating to the nervous system in the fullest sense of these words; Philipeaux prize (900 francs), for experimental physiology; Fanny Emden prize (3000 francs), for the best work treating of hypnotism, suggestion, and generally of physiological action exerted at a distance from the animal organism.

Statistics.—Montyon prize (one prize of 1000 francs, two mentions of 500 francs), for statistical researches of any nature.

History and Philosophy of the Sciences.—Binoux prize (2000 francs).

Medals.—Arago medal, awarded by the Academy at any time that a discovery, work, or service rendered to science appears worthy of this testimony of high esteem; Lavoisier medal, awarded under conditions applying to the Arago medal, for services rendered to chemistry; Berthelot medal, to holders each year of the prizes in chemistry.

General Prizes.—Prize founded by the State (3000 francs), question for 1919: researches on the geographical and bathymetric migrations of fishes and on the conditions which govern them; Bordin prize (3000 francs), question for 1919: in the theory of integrals of total differentials of the third species and double integrals relating to an algebraic function of two independent variables, the existence of certain numbers (*nombres entiers*) has been demonstrated, of which it is difficult to obtain the value, and may depend on the arithmetical nature of the coefficients of the equation of the surface corresponding with the function. The Academy requires a profound study of these numbers in particular cases. Vaillant prize (4000 francs), question for 1919: to discover a photographic layer, without visible grain, and as sensitive as the gelatino-bromide at present in use; Petit D'Ormoy prize: two prizes of 10,000 francs each, one for pure or applied mathematics, the other for natural science; Jean Jacques Berger prize (15,000 francs), for work relating to the city of Paris; Saintour prize (3000 francs), for work in the mathematical sciences; Henri de Parville prize (1500 francs), for a book on original science, or popularisation of science; Lonchampt prize (4000 francs), for the author of the best memoir on the diseases of man, animals, or plants from the special point of view of the introduction of mineral substances in excess as the cause of the disease; Henry Wilde prize (one of 4000 francs, or two of 2000 francs), for a discovery or work on astronomy, physics, chemistry, mineralogy, geology, or experimental mechanics; Gustave Roux prize (1000 francs); Thorlet prize (1600 francs).

Special Foundations.—The Lannelongue foundation (2000 francs), for one or two persons at most, in reduced circumstances, belonging themselves, or by their marriage, or parents, to the scientific world, with preference to medicine. Laplace prize, for the pupil leaving the Ecole Polytechnique holding the first place. L. E. Rivot prize (2500 francs), divided between the four pupils leaving the Ecole Polytechnique each year with the first and second places in the divisions of *mines* and *ponts et chaussées*. Normal School prize (2000 francs) will be awarded after the conclusion of the war to an old pupil, killed or wounded in the field, in recompense or in view of scientific work.

Funds for Scientific Research.—Trémont foundation (1000 francs); Gegner foundation (4000 francs); Jérome Ponti foundation (3500 francs); Henri Becquerel foundation (3000 francs); Bonaparte foundation (50,000 francs); Loutreuil foundation (125,000 francs); Charles Bouchard foundation (5000 francs).

GLASS TECHNOLOGY.

WE have now before us Nos. 1 to 3 of the Journal of the Society of Glass Technology. The first of these has already been noticed in these columns (NATURE, July 26, 1917). The two additional numbers now available indicate the healthy progress of this new society, and augur well for the renewed vitality of the glass industry in this country. The papers which appear in this journal cover a wide range of subjects and vary very considerably in size and

value; they may, perhaps, be regarded as somewhat minor contributions to a great subject, but that is as much as can be expected at a time when all our best energies are devoted to "doing" rather than to writing or talking about what has been and is being done. Thus, Sir Herbert Jackson's address, "Some General Observations on Glass," is interesting and suggestive, but obviously deals only with some of the fringes of the great work on which its author is known to be engaged.

Two subjects of very great immediate interest and importance are, however, dealt with in these Journals. The first of these relates to refractories. The papers by Fearnsides, Davidson, Rosenhain, and Cosmo Johns form part of a special discussion on refractories for the glass industry held by the society in Sheffield as a supplement or extension of the discussion on this subject inaugurated by the Faraday Society. On the basis of these papers the Society of Glass Technology was able to formulate the requirements of the glass industry in regard to refractories and to submit these to a conference on refractories afterwards held in London. This activity is of very considerable importance, because it is hoped that as the result of these conferences a "Refractories Research Association" may shortly be formed, for the purpose, in the first place, of furnishing fresh support and co-ordination for the various researches on refractories already in progress at various centres, such as the pottery laboratories at Stoke-on-Trent and at the National Physical Laboratory, and also of initiating much-needed additional researches both at those institutions and, possibly, elsewhere. The interests of the glass industry are most intimately concerned with this whole question of refractories—indeed, it is probably not too much to say that progress in glass manufacture depends almost entirely on progress in refractories. It may be hoped, therefore, that the Society of Glass Technology will give its best efforts to support this movement for research on refractories. Above all, it is to be hoped that no spirit of local or provincial jealousy will be allowed to interfere with the proper distribution and development of this work, whether at Sheffield, Stoke, or Teddington.

The second subject of great and immediate scientific and industrial interest touched upon in this journal is the question of the behaviour of glass in contact with chemical reagents and the correlated question of the testing of chemical laboratory glassware. This is a subject which, before 1914, had received very considerable attention in Germany, and there was a natural tendency to look to the work of the "Reichsanstalt" for guidance in these matters. The necessity for producing satisfactory laboratory glass in this country has led to a new and independent attack on the whole subject, and it has wisely come to be recognised that if the laboratory glass industry is to flourish in England after the war, it must be reinforced by an adequate system of testing by some recognised institution which will afford to the buyer and user of the ware an adequate guarantee of its good quality. The institution and organisation for dealing with a system of testing of this kind are, fortunately, already in existence at the National Physical Laboratory, and only need the provision of additional accommodation and staff to allow of their immediate application to the whole industry.

The question of the precise nature of the tests to be applied, however, is more difficult. Here, as in all cases where the power of prolonged endurance of an article or a material is to be tested, it is necessary to devise some accelerated test which shall—in a few hours or, at most, days—furnish an indication of the probable behaviour of the article in ordinary use over a period of months or years. In such cases it is difficult, if not impossible, to retain similarity or proportionality in the tests in such a way that the article giving the best test shall also be that which gives the best actual wear in use. In the case of glassware, in which resistance to hot water and to acids and alkalis and to such vigorous reagents as ammonium chloride and ammonium sulphide is demanded, as well as resistance to sudden changes of temperature and adequate mechanical strength, the problem is particularly complex—thus a variety of glass specially resistant to hot water may not be so resistant to hydrochloric acid, while a glass having a high degree of thermal endurance may not be adequately resistant to water.

The whole question of the tests to be applied has now been systematically studied for a considerable time, both at the National Physical Laboratory and by a special committee of the Institute of Chemistry, while two papers, by Messrs. Westwood, Cauwood, and Turner, and Messrs. Cauwood, English, and Turner respectively, in the present journal, furnish an interesting and important contribution to the subject. It may be hoped that agreement on this matter, sufficient to arrive at a working specification for routine testing, may soon be arrived at, and that the National Testing Bureau for Glass may commence its beneficent work for the British glass industry at no distant date.

X-RAYS AND THE WAR.[1]

IT was close on two years before the first formal meeting of the Röntgen Society, just twenty years ago, that Röntgen had stumbled, so to speak, across a new type of radiation, the wonderful properties of which excited the whole civilised world.

Since then the art of radiography has gradually extended into fields once never dreamt of. A present-day development, very typical of the times, is the detection of contraband metals, the examination of autogenous welds, and the scrutinising of steel and other metal castings and plates for faults and blow-holes. Such work demands high voltages and the heaviest outputs. Already steel plates more than 1 in. thick have been successfully examined.

But the all-important use of the X-rays is their medical application. Every hospital of any size now has its X-ray department, and there are many thousands of radiologists—both medical and laymen—devoting their lives to the work. X-ray technique has improved so vastly as to give the diagnostic methods of physician and surgeon a facility and exactitude never deemed possible at one time.

In the large military hospitals the great majority of wounded soldiers are X-rayed. The examination of wounds and injuries by X-rays has, in fact, become routine practice, whether in the field, by the use of the ingenious and cleverly designed motor-lorry outfits, or in the base hospitals. The X-ray has become as indispensable as the dressing or the splint, and it is an essential adjunct in prescribing and directing, as well as avoiding, operations. Even sprains are radiographed to find whether there is any slight bone fracture—as there very often is.

The X-ray detection of embedded bullet and shell fragments is now so certain as to be commonplace. Bullets and shrapnel are found and removed from any part of the body, even from the lung and brain or in the region of the heart. Precise instruments for localisation in the actual operating theatre are now in use, and even during the operation itself the surgeon's instrument may be guided to the foreign body. Stereoscopic fluoroscopy is possible, and if a practical apparatus could be produced it would be of incalculable

[1] Abridged from the Presidential Address delivered to the Röntgen Society on November 6, 1917, by Capt. G. W. C. Kaye.